

DOCUMENT RESUME

ED 263 689

EA 018 094

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TITLE Brain Dominance Patterns of Tennessee School Leaders.
PUB DATE 7 Nov 85
NOTE 31p.; Paper presented at the Annual Meeting of the Mid-South Educational Research Association (Biloxi, MS, November 6-8, 1985). Condensation of the more significant findings from the author's doctoral dissertation, "A Discussion of Brain Hemisphere Characteristics and Creative Leadership among Selected Educational Administrators in Tennessee," University of Tennessee, Knoxville.
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Administrator Characteristics; Administrator Role; *Cognitive Measurement; *Cognitive Processes; Elementary Secondary Education; *Leadership Qualities; *Leadership Styles; Problem Solving; Public Schools; Questionnaires; Surveys
IDENTIFIERS *Herrmann Brain Dominance Survey; Tennessee

ABSTRACT

This exploratory study investigated the leadership styles of selected administrators in Tennessee's public schools. Styles of leadership were viewed against a backdrop of current brain research, and the subjects' underlying patterns of cognitive processing were identified by means of a self-report measurement of brain dominance--the Herrmann Brain Dominance Survey--and a researcher-developed questionnaire designed to assess the perceived innovation of each leader. A review of related research supported the belief that certain contrasting leadership qualities are essential to creative leadership: analysis vs. conceptualization; logic vs. intuition; maintenance vs. creativity; task vs. relationship; and stability vs. flexibility. The study viewed cognitive style in relationship to these paired qualities and speculated that leaders who exhibit a holistic dominance style synthesize these qualities most effectively. References are included, along with an appendix containing predominant dominance codes, clusters, and classifications in the Herrmann Brain Dominance Survey. (TE)

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BRAIN DOMINANCE PATTERNS OF TENNESSEE
SCHOOL LEADERS

Presented to the
Mid-South Educational Research Association
Biloxi, Mississippi
November 7, 1985

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Forward

This paper is a condensation of the more significant findings from the author's doctoral dissertation . The complete work includes a literature review highlighting: 1) Brain Research, 2) Creative Leadership, and 3) Education and the Change Process. Included in the original study are copies of all survey instruments, a detailed analysis of presented data, and an extensive bibliography.¹

¹Norris, Cynthia J. A Discussion of Brain Hemisphere Characteristics and Creative Leadership Among Selected Educational Administrators in Tennessee. University of Tennessee: Knoxville, 1984.

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I. Introduction to the Study

Introduction

"Man is limited not so much by his tools as by his vision. . . ."

Pascale, Richard Tanner and Anthony G. Athos. The Art of Japanese Management. New York: Simon and Schuster, 1981, p. 21.

If the present educational system is to meet the challenge of its own survival, education's leaders will need to look beyond mere technical know "know how" to a redirection of purposes and goals. The emphasis placed on superintendents as balancers of financial accounts and guardians of the status quo must be superceded by the more urgent need for leaders who can conceptualize visions of the future and guide their organizations in shaping new directions. Are today's educational leaders governed by such thought processes; and if not, what implications does current brain research have for the modification of existing leadership styles?

Purpose

This exploratory study investigated the leadership styles of selected administrators in Tennessee's public schools. Styles of leadership were viewed against a backdrop of current brain research, and underlying patterns of cognitive processing were identified. A review of related literature supported the belief that certain contrasting leadership qualities are essential to creative leadership. Such pairs include: analysis vs. conceptualization; logic vs. intuition; maintenance vs. creativity; task vs. relationship; and stability vs. flexibility. This study viewed cognitive style in relation to these paired qualities and speculated that leaders who exhibit a holistic dominance style synthesize these opposing qualities most effectively.

Procedures

Subjects for this study were selected by a professional panel of experts to be among the most effective educational leaders in the state. Each was ranked according to the Katz' skills of management (i.e. technical, human, conceptual) most prominently displayed. All subjects completed: 1) a self-report measurement of brain dominance, 2) The Herrmann Brain Dominance Survey and 3) a researcher-developed questionnaire designed to assess the perceived innovation of each leader. A composite picture was formulated of each administrative group based on results of this instrumentation.

A total of 115 subjects took part in the study. Subjects included: 27 nominated superintendents, 39 principals, 37 supervisors and 12 random-sample

superintendents. The random sample was selected from among the remaining superintendents in the state in an effort to support the nomination process and lend credence to the validity of the questionnaire.

Instrumentation/Brain Dominance

The Herrmann Brain Dominance Survey provided a three dimensional analysis of brain dominance by considering both the lower limbic as well as the cerebral brain regions. Dominance was viewed as hemispheric along two different planes. This resulted in the following quadrant arrangement:

- 1) cerebral left: analytical, logical style
- 2) limbic left: organized, conservative style
- 3) cerebral right: creative, conceptualizing style
- 4) limbic right: interpersonal, sensitive style

Each quadrant of the Herrmann survey received a dominance score of : 1 (signifying primary dominance), 2 (signifying secondary dominance), or 3 (indicating minimal use). These scores were assigned on the basis of the scale-score cut-off points for each quadrant: (67-100=1; 34-66=2; 2-33=3).

The Appendix contains predominant dominance codes, clusters and classifications.

Instrumentation/Innovation

The Perceived Innovation Questionnaire, built from recent research related to leadership and change, was designed by the researcher to assess perceived innovation. Respondents were asked to report the perceived quantitative aspects of their own influence on innovation or change. Questionnaire items related to four general areas: 1) innovation in current position, 2) involvement of others in innovation and new directions, 3) innovative tone in personality, and 4) implementation of change.

Rank values were determined for each question based on an averaging of the responses from an item analysis. Each question was assigned a particular value of High (3 points), Flexible (2 points) or Moderate (1 point). Each subject received a total score. Respondents were classified into one of the following groups: High = 185+, Medium = 156-184, and Low = 155 or less.

Katz Rankings

Administrators in this study were ranked by the nominators according to the three leadership skills identified by Katz (1974): conceptual, human, and technical. Subjects recieved a ranking of 1 for the skill most characteristic of their management style, 2 for the second most characteristic skill and a 3 for the skill least representative of their management approach. This system

provided a forced choice whereby each subject received each numerical ranking only once. (See Appendix for a definition of ratings.)

Hypotheses and Questions

Five general hypotheses guided this ex post facto study: 1) leadership in education is characterized by a style predominantly left-brained in orientation, 2) as level of educational position increases, so does the likelihood that leaders will be more narrowly left-brained in focus, 2) female administrators are more whole-brained oriented in cognitive style than males, 4) supervisors, whose duties are more staff than line, exhibit a better balance in hemisphere dominance than other administrative groups, and 5) conceptual skill is less evident among educational administrators at higher administrative levels.

The study was guided by specific questions; however, for the purposes of this paper, only selected ones (along with the resulting data) will be discussed. The original study contains a complete listing of all questions and a presentation of related data. Questions to be discussed in this paper will serve as introductory points for the presentation of each data grouping.

Presentation of Findings

Patterns of Dominance

Question 1: What brain dominance patterns are most prevalent among the following groups of educational leaders: nominated superintendents, principals, supervisors and a small random sample of superintendents. Table 1 presents the frequency distribution by dominance codes for all subjects in the study. As shown, the most prevalent codes were: 1122 (n=29); 1121 (n=16) and 1111, 1112 and 2111 (n=11 respectively). These five codes account for a total of 78 (76%) of the 103 subjects in the nominated sample. In contrast, the random sample has 6 subjects (50%) with the 1122 code and 3 (25%) with the 1112 code.

The most frequent codes by group are presented in Table II. The 1122 code is most prevalent for all groups; however, for principals and supervisors the more holistic codes of 1121 and 2111 are also prominent.

Differences in Dominance Among Administrative Groups

Question 2: What are the differences among these groups in terms of dominance patterns?

Not only was dominance considered in relation to code and cluster type, but it was analyzed by using the Herrmann Brain Dominance left and right-brain raw scores of respondents as well. Table III shows comparisons of the means for all groups when brain dominance is represented by a total of left vs. right-brain

TABLE I
FREQUENCY DISTRIBUTION ADMINISTRATORS/SUPERVISORS BY BRAIN DOMINANCE CODE IN TENNESSEE, 1984

Dominance Code	Nominated Sample (N 103)				Random Sample (N=12)			
	Frequency	Cumulative Frequency	Percent	Cumulative Percent	Frequency	Cumulative Frequency	Percent	Cumulative Percent
1111	11	11	10	10	0	0	0	0
1112	11	22	11	21	3	3	25	25
1121	16	38	16	37	0	3	0	25
1122	29	67	28	65	6	9	50	75
1123	1	68	1	66	0	9	0	75
1131	1	69	1	67	0	9	0	75
1132	1	70	1	68	1	10	8	83
1211	1	71	1	69	0	10	0	83
1221	3	74	3	72	1	11	9	92
2111	11	85	11	83	0	11	0	92
2112	7	92	7	89	1	12	8	100
2121	4	96	4	93	0	12	0	100
2122	5	101	5	98	0	12	0	100
2211	2	103	2	100	0	12	0	100

TABLE II
FREQUENCIES AND PERCENTAGES OF MOST PREVALENT DOMINANCE PATTERNS
AMONG ADMINISTRATORS (N=115) IN TENNESSEE, 1984

Group	#1 Code	N	%	#2 Code	N	%	#3 Code	N	%	Total %
Nominated Superintendents	1122	10	37%	1112	5	19%	1111	3	12%	68%
Principals	1122	11	29%	1121	9	23%	1111	5	13%	65%
Supervisors	1122	8	22%	2111	8	22%	2112	6	17%	61%
Random Sample Superintendents	1122	6	50%	1112	3	25%	--	-	-	75%

TABLE III

MEANS FOR LEFT/RIGHT BRAIN DOMINANCE BY ADMINISTRATIVE GROUP IN TENNESSEE, 1984

Variable	Number	Mean	Standard Deviation	Minimum	Maximum	Standard Error	Sum	Variance
<u>Nominated</u>								
Superintendents								
Right	27	77.89	19.88	45	121	3.83	2103	395.10
Left	27	128.11	8.95	113	142	1.72	3459	80.18
Principals								
Right	39	88.69	21.18	59	158	3.39	3459	448.38
Left	39	118.67	16.69	82	148	2.67	4628	278.49
Supervisors								
Right	37	97.95	28.29	55	185	4.65	3624	800.05
Left	37	105.46	20.76	47	136	3.41	3902	431.09
Total Group								
Right	103	89.18	24.74	45	185	2.44	9186	611.84
Left	103	116.40	18.92	47	148	1.86	11989	358.02
<u>Random Sample</u>								
Superintendents								
Right	12	75.83	18.16	42	109	5.24	910	329.97
Left	12	131.83	15.04	91	150	4.34	1582	226.33

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score. Highest left-brained orientation is among the superintendents (128.11) and highest right-brained style is among supervisors (97.95). Very little variance exists between the left and right brain means for supervisors (left: 105.46 vs. right: 97.95) indicating a more holistic style.

Some interesting similarities are revealed among the three nominated groups, (i.e., superintendents, principals and supervisors) as shown in Figure 1. First, as a group these administrators appear quite similar in the degree of conceptual-creative style that they display. The scaled score mean for each nominated group falls between 62 and 72. A similar finding appears in the lower left quadrant representing organizational ability and status quo orientation where the mean scaled scores for all groups fall between 71 and 99 points.

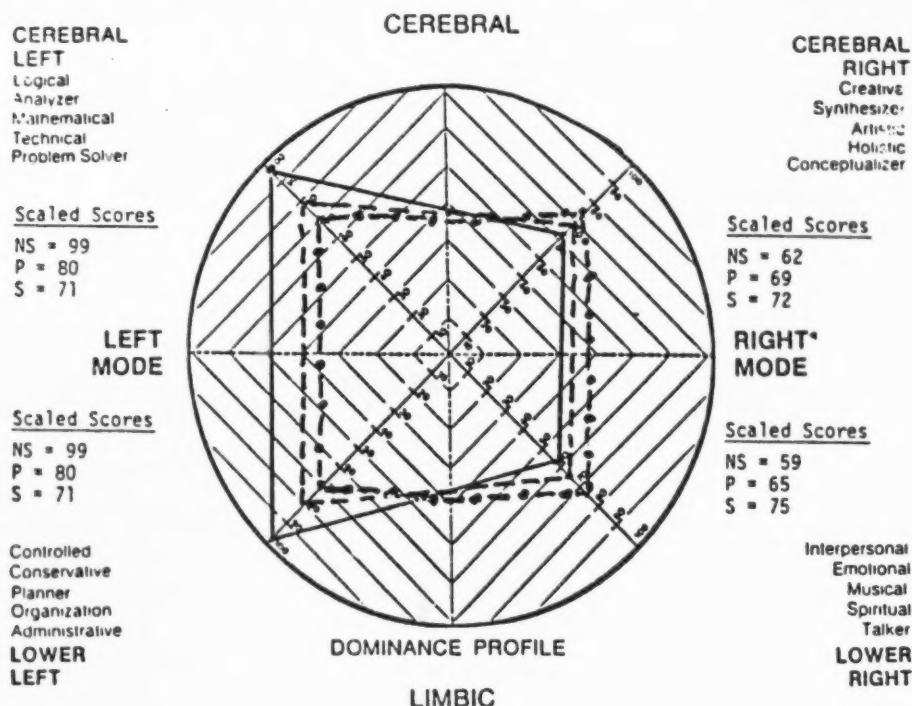


Figure 1: Profiles of Nominated Superintendents, Principals and Supervisors.

- NS = Nominated Superintendents
- P = Principals
- S = Supervisors

Figure 2 represents a composite profile of all administrators in the nominated sample (N=103). This composite places the administrators in this

study into the 1121 dominance cluster characterized by not only a strong left-brain dominance (which reflects logical analytical skills as well as organizational ability) but also a dominance in the upper-right brain quadrant (which is necessary for conceptualized thinking and intuitive response).

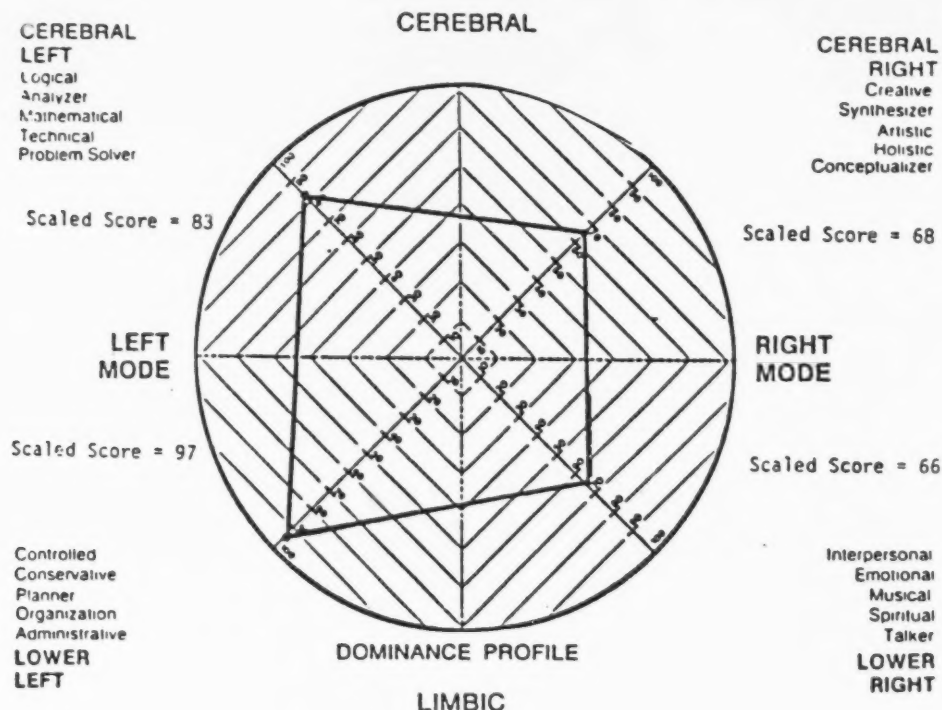


Figure 2: Composite Profile of School Administrators--Code 1121, (N=103)

Dominance Patterns Compared to Katz Rankings

Question 3: Is there a difference among respective nominated groups between brain dominance as measured by the Herrmann Survey and the Katz skills of management.

Nominators ranked the subjects of this study according to the following Katz's leadership skills: conceptual, technical and human. A forced-choice response gave each subject a 1, 2 and 3 for human, conceptual and technical skill as judged by each nominator.

Table IV presents the frequency distributions and percentages of subjects receiving such rankings for each administrative group. As shown, superintendents ranked highest in technical skill (45 percent) and lowest in

conceptual skill (15 percent); principals ranked highest in conceptual skill (36 percent) and lowest in technical skill (31 percent); and supervisors ranked highest in human skills (41 percent) and lowest in conceptual and technical skills respectively (30 percent).

TABLE IV
FREQUENCY DISTRIBUTION CONCEPTUAL, HUMAN, TECHNICAL NOMINATIONS BY
ADMINISTRATIVE GROUP AND NOMINATION RANK IN TENNESSEE, 1984

Rank		Superintendents				Principals				Supervisors		
		Conceptual	Human	Technical	Total	Conceptual	Human	Technical	Total	Conceptual	Human	Technical
1	Number	4	11	12	27	14	13	12	39	11	11	11
	Percent of Group	(15%)	(41%)	(45%)	101	(36%)	(34%)	(31%)	101	(30%)	(41%)	(30%)
2	Number	9	12	6	27	10	18	11	39	8	15	14
	Percent of Group	(34%)	(45%)	(23%)	102	(26%)	(47%)	(29%)	102	(22%)	(41%)	(38%)
3	Number	14	4	9	27	15	8	16	39	18	7	12
	Percent of Group	(52%)	(15%)	(34%)	101	(38%)	(21%)	(41%)	100	(49%)	(19%)	(33%)
Total Number		27	27	27		39	39	39		37	37	37
Total Percent		101	101	102		100	102	101		101	101	101

NOTE: Percent may not = 100 due to rounding.

The total group was viewed in terms of whole-brain/right vs. left-brain/limbic dominance in relation to administrative skill and nomination rank. Table V contains Chi Square analyses for each administrative skill based on dominance classification and nomination rank. Results of the Chi Square analyses ($p = < .05$) indicate that those most likely to receive a high ranking on conceptual skill were whole-brained/right-brained in cognitive style (23 percent right vs. 5 percent left). Those receiving a lower ranking on conceptual skill were more evenly divided between right and left-brain style (24 to 21 percent).

Rating of human skill has less relationship to a specific cognitive style ($p > .53$) while ratings of technical skill approached significance (.07) for a left-brained cognitive style.

This finding is further confirmed through a series of t -tests in which the right-brain score of conceptual ranking number 1 was compared with the right-brain score of technical ranking number 1. Table VI presents these data.

TABLE V
PERCENTAGE OF RIGHT AND LEFT HEMISPHERE SUBJECTS BY RANK OF NOMINATION AND CLASSIFICATION
CONCEPTUAL, HUMAN AND TECHNICAL SKILL (N=103) IN TENNESSEE, 1984

Nomination Rank	Conceptual			Human			Technical		
	Right	Left	Total	Right	Left	Total	Right	Left	Total
1	24 (23%)	5 (5%)	37 (28%)	21 (20%)	18 (17%)	39 (38%)	15 (15%)	20 (19%)	35 (34%)
2	11 (11%)	16 (16%)	27 (26%)	29 (28%)	16 (15%)	45 (44%)	20 (19%)	11 (11%)	31 (30%)
3	25 (24%)	22 (21%)	47 (46%)	10 (10%)	9 (9%)	19 (18%)	25 (24%)	12 (12%)	37 (36%)
Total	60 (58%)	43 (42%)	103 (100%)	60 (58%)	43 (42%)	103 (100%)	60 (58%)	43 (42%)	103 (100%)
Chi Square 11.06 df=2 Probability .004			Chi Square 1.26 df=2 Probability .53 ns			Chi Square 5.23 df=2 Probability .07			

Conceptual skill, as shown by nomination rank, is more closely related to right-brain dominance than is technical skill. This is true for the total group ($p = .0004$) and for the nominated superintendents ($p = .01$). It is true (but not significant) to a lesser degree for principals ($p = .07$) and supervisors ($p = .13$).

TABLE VI
t-TEST--CONCEPTUAL #1 AND TECHNICAL #1 BY RIGHT BRAIN SCORE FOR
ADMINISTRATIVE GROUPS IN TENNESSEE, 1984

	Number	Mean	Standard Deviation	Standard Deviation Error	Minimum	Maximum	t-test	Degrees of Freedom	Probability
<u>Total Group</u>									
Conceptual #1	29	102.68	28.31	5.25	66	185	3.77	50	.0004*
Technical #1	35	78.82	20.77	3.51	45	150			
<u>Superintendents</u>									
Conceptual #1	4	105.50	18.30	9.15	79	121	3.80	4	.01*
Technical #1	12	67.08	14.84	4.28	45	88			
<u>Principals</u>									
Conceptual #1	14	97.07	25.81	6.89	69	158	1.86	21	.07 ns
Technical #1	12	82.00	14.49	4.18	65	115			
<u>Supervisors</u>									
Conceptual #1	11	108.81	34.49	10.39	66	185	1.56	18	.13 ns
Technical #1	11	88.18	26.82	8.08	55	150			

*Significant ($p \leq .05$).

A similar finding was revealed when a t-test was used to compare right-brain scores of those individuals receiving a nomination rank of 1 in conceptual skill against those receiving nomination ranks of 2 or 3. As shown in Table VII results clearly support the likelihood that superintendents nominated as highly conceptual (i.e., "1") will also be right-brained ($p = .03$). Results for the other two groups are not significant, but they tend toward the same conclusion (principals at $p = .10$ and supervisors at $p = .19$).

The final stage of analysis employed for this question was to isolate each position value in the individual brain dominance code and to measure the value of that position in terms of the qualities it represented against the Katz skill

that most nearly represented what that quadrant of the brain was purported to measure. In a dominance code such as 2132, the position codes are:

I	II	III	IV
2	1	3	2

Position I relates to technical skill as it applies to logical, analytical reasoning; Position II more closely relates to technical skill defined as

TABLE VII

t-TEST--CONCEPTUAL #1 AND CONCEPTUAL #2 OR #3 BY RIGHT BRAIN SCORE FOR ADMINISTRATIVE GROUPS IN TENNESSEE, 1984

	Number	Mean	Standard Deviation	Standard Deviation Error	Minimum	Maximum	t test	Degrees of Freedom	Probability
<u>Superintendents</u>									
Conceptual #1	4	105.50	18.30	9.15	79	121	3.32	3.8	.03*
Conceptual #2	23	73.08	16.07	3.35	45	109			
<u>Principals</u>									
Conceptual #1	14	97.07	25.81	6.89	69	158	1.70	19.4	.10 ns
Conceptual #2	25	84.00	16.88	3.37	59	124			
<u>Supervisors</u>									
Conceptual #1	11	108.81	34.49	10.39	66	185	1.35	14.5	.19 ns
Conceptual #2	26	93.34	24.54	4.81	55	150			

*Significant ($p \leq .05$).

TABLE VIII

RESULTS OF CHI SQUARE ANALYSES OF KATZ'S ADMINISTRATIVE SKILL RANKING BY DOMINANCE POSITION VALUE FOR TOTAL GROUP (N=103) IN TENNESSEE, 1984

Rank	Technical Skill/ Position I			Technical Skill/ Position II			Human Skill/ Position III			Conceptual Skill/ Position IV		
	Dominance Code Value			Dominance Code Value			Dominance Code Value			Dominance Code Value		
	1	2+3	Total	1	2+3	Total	1	2+3	Total	1	2+3	Total
1	29 (29%)	6 (6%)	35 (34%)	34 (33%)	1 (1%)	35 (34%)	21 (20%)	18 (17%)	39 (38%)	23 (22%)	6 (6%)	29 (28%)
2	21 (20%)	10 (10%)	31 (30%)	29 (28%)	2 (2%)	31 (30%)	15 (15%)	30 (29%)	45 (44%)	9 (9%)	18 (17%)	27 (26%)
3	24 (23%)	13 (13%)	37 (36%)	34 (33%)	3 (3%)	37 (36%)	7 (7%)	12 (12%)	19 (18%)	17 (17%)	30 (29%)	47 (46%)
Total	74 (72%)	29 (28%)	103 (100%)	97 (94%)	6 (6%)	103 (100%)	43 (42%)	60 (58%)	103 (100%)	49 (48%)	54 (52%)	103 (100%)
Chi Square 3.24 df=2 Probability .19 Cells to Sparse to Compute Chi Square 3.85 df=2 Probability .15 Chi Square 16.35 df=2 Probability .0003												

organizational ability; Position III relates to human relations skill, and Position IV relates to creative or conceptual skill. A Chi Square analysis was used to investigate the differences between the variables of Katz skill rank and brain dominance position value or code as shown by the sample.

Table VIII shows that position value is highly significant ($p = .0003$) for all subjects when the dominance code of Position IV is analyzed relative to the ranking that subjects received on conceptual skill. Although non-significant, data tended in the expected direction for the analysis of Position III and human skills ($p = .15$) and Position I and technical skill ($p = .19$). A Chi Square analysis was not possible for Position II due to small cell size in key cells. A review of the percentages, however, indicates a definite trend for those nominated #1 Technical Skill to be dominant in Position II (i.e., 33% - 1%).

Technical skill, defined as logical, theoretical knowledge base that can be applied as educational technique, is reflected by dominance in the upper left quadrant of the brain dominance pattern (Position I). The comparison among groups shows that significant differences ($p = .006$) do exist relative to the degree of dominance present in that quadrant. For superintendents and principals there is a definite tendency for those ranked #1 in technical skill to be dominant in the upper left quadrant; for supervisors the tendency is less apparent (Table IX).

TABLE IX

ADMINISTRATIVE GROUP BY NOMINATION VALUE OF ADMINISTRATIVE SKILL AS
DEFINED BY KATZ (N=103) IN TENNESSEE, 1984

Group	Technical Skill/ Position I Dominance Code Value						Technical Skill/ Position II Dominance Code Value						Human Skill/ Position III Dominance Code Value						Conceptual Skill/ Position IV Dominance Code Value						
	1		2 or 3		Total		1		2 or 3		Total		1		2 or 3		Total		1		2 or 3		Total		
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	
Superintendents (N=27)	24		3		27		26		1		27		9		18		27		10		17		27		
Percent of Total		23		3		26		25		1		27		9		17		26		10		17		27	
Percent of Group		89		11				96		4				33		67				37		63			
Principals (N=39)	30		9		39		38		1		39		13		26		39		19		20		39		
Percent of Total		29		9		38		37		1		38		13		25		38		18		19		39	
Percent of Group		77		23				97		3				33		67				49		51			
Supervisors (N=37)	20		17		37		33		4		37		21		16		37		20		17		37		
Percent of Total		19		17		36		32		4		36		20		16		36		19		17		37	
Percent of Group		54		46				89		11				57		43				54		46			
Total	N	74		29		103		97		6		103		43		60		103		49		54		103	
	%			72		28		100		94		6		100		42		58		100		48		52	
		Chi Square 10.16 df=2 Probability .006						Cells to Sparse to Compute						Chi Square 5.34 df=2 Probability .07						Chi Square 1.84 df=2 Probability .40					

The strong tendencies in this direction within groups appear to be with superintendents who show a percentage differential of 89 to 11 for high dominance score in relation to high technical nomination and principals who exhibit a dominance pattern in the same direction (77 to 23 percent). For supervisors this factor seems to have little influence (54 to 46 percent). The total group, however, demonstrates a likelihood of 72 to 28 percent that those nominated #1 in technical skill will have a dominance in the upper left quadrant. This represents a ratio for the total group of 2.5 to 1.

Table X presents the mean scores of the three nominated administrative groups and the random sample group of the PIQ (Preceived Innovation Questionnaire). As demonstrated, the mean score for each nominated administrative group respectively was within the medium range (i.e., 155 to 182) of the PIQ. The random sample group's was in the high range (198.75). The principals obtained the highest mean scores (176.56) on the PIQ of the nominated groups. The middle score (169.70) was made by superintendents who also had the lowest minimum score (65). The lowest group mean score (165.81) was obtained by the nominated supervisors who also had the lowest maximum score (259) of any group. Greatest variance within groups as shown by standard deviations was with the random sample and nominated superintendents.

TABLE X

MEANS, STANDARD DEVIATION, AND RANGE OF SCORES FOR TOTAL SCORE
ON PERCEIVED INNOVATION QUESTIONNAIRE BY ADMINISTRATIVE
GROUP IN TENNESSEE, 1984

Administrative Group	Number	Mean	Standard Deviation	Minimum	Maximum
Nominated Superintendents	27	169.70	37.52	65	269
Principals	39	175.56	35.50	116	270
Supervisors	37	165.81	33.12	108	259
Random Sample Superintendents	12	198.75	45.04	127	280
Nominated Group	103	170.52	35.12	65	270

Differences in Innovation/Leadership by Leadership Position and Sex

Question 4. Do differences exist between innovation/leadership and brain dominance patterns by leadership position and sex?

In addressing this question, it was important to determine if differences in creative leadership and cognitive styles existed not only for the total nominated sample (n=103) but also within groups: nominated superintendent (n=27); principal (n=39); supervisor (n=37); and for the supplemental group of random sample superintendents (n=12) as well. Creative management was investigated based on a ranking of the Total Score on the Perceived Innovation Questionnaire resulting in the following ranges: High - Above 182; Medium - 155 to 182; Low - Below 155.

A series of t-tests was used to determine if differences existed between dominance as measured by left/right brain score and perceived innovation as determined by the PIQ. Results of t-tests by respondent groups divided by brain dominance (right/left) on Total Score of PIQ yielded no significant differences for the three groups. The results for the total group approach significance ($p = .06$). Subtotal score of PIQ yielded significant results for total group ($p < .05$) and for supervisors ($p < .05$). (Table XI).

Leadership Position

As previously discussed, in investigating differences between administrative groups, total score was considered by levels (high, medium, and low) and brain dominance was classified by dominance clusters (whole-brained/right-brained vs. left-brained/limbic). Figure 3 presents percentages based on these factors for all groups. As shown by Figure 3, the principals' group had the highest percentage of right-brained subjects scoring at the highest level of innovation (26 percent) in contrast to nominated superintendents (19 percent) and supervisors (14 percent). Data suggest that, for principals, innovative management depends more upon a right-brained orientation than for either of the other two groups. When considering the total range of scores on the questionnaire, supervisors tend to be whole-brained/right-brained dominant almost 2 to 1 (62 to 38 percent) in contrast to a 1 to 1 ratio for nominated superintendents (52 to 48 percent) and 1.5 to 1 for principals (59 to 41 percent).

Sex. There were 70 male and 33 female subjects in this study. The distribution by sex was: nominated superintendents, 27 males, 0 females; principals, 28 males, 11 females; supervisors, 14 males, 22 females; and random sample superintendents, 11 males 1 female. Data in Figure 4 show that females

TABLE XI

t-TEST TOTAL SCORE ON PERCEIVED INNOVATION QUESTIONNAIRE BY BRAIN DOMINANCE
(RIGHT/LEFT) FOR ADMINISTRATIVE GROUPS IN TENNESSEE, 1984

Score on PIQ	Number	Mean	Standard Deviation	Standard Error	Minimum	Maximum	t	Probability
<u>Total Group (N=103)</u>								
Right	60	175.88	35.12	4.53	118	270	1.85	.06
Left	43	163.04	34.12	5.20	65	231		
<u>Nominated Superintendents (N=27)</u>								
Right	14	178.14	38.37	10.25	135	269	1.22	.23
Left	13	160.61	35.82	9.93	65	226		
<u>Principals (N=39)</u>								
Right	23	178.86	35.21	7.34	118	270	.68	.49
Left	16	170.81	36.50	9.12	116	231		
<u>Supervisors (N=37)</u>								
Right	23	171.52	34.14	7.11	122	259	1.40	.17
Left	14	156.42	30.20	8.07	108	218		
<u>Subtotal Group (N=103)</u>								
Right	60	97.11	22.79	2.94	59	160	2.83	.005*
Left	43	84.91	20.90	3.18	44	140	2.79	
<u>Nominated Superintendents (N=27)</u>								
Right	14	92.78	25.48	6.81	66	160	1.41	.17
Left	13	80.53	19.35	5.36	55	123	1.39	
<u>Principals (N=39)</u>								
Right	23	96.65	19.96	4.16	74	159	1.12	.26
Left	16	88.50	23.59	5.89	44	140	1.16	
<u>Supervisors (N=37)</u>								
Right	23	100.21	24.27	5.06	59	160	2.14	.03*
Left	14	84.57	19.70	5.26	48	132	2.03	

*Significant ($p \leq .05$).

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were predominately right-brained (78 percent) and that males were approximately evenly distributed between right and left-brained (49 to 51 percent).

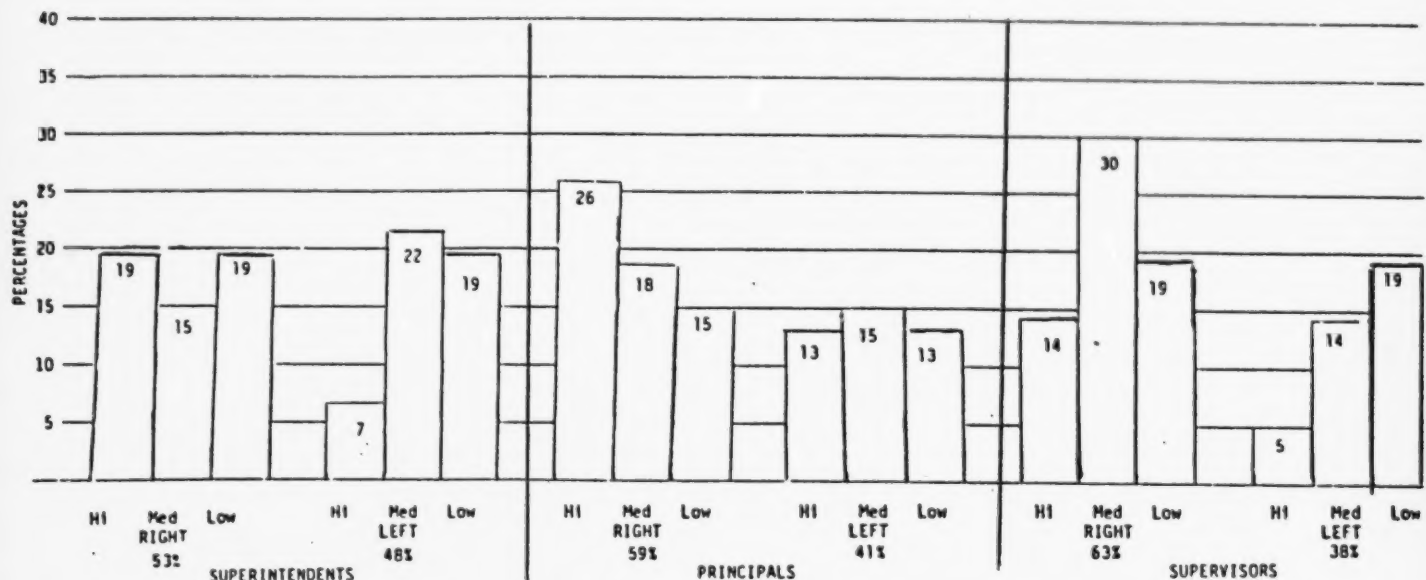


Figure 3: Innovative Management Questionnaire Score Ranges (Low, Medium, High) for a Nominated Administrative Group by Right or Left Dominance.

NOTE: Due to rounding, groups may not equal 100%

An almost equal percentage of right-brained/whole-brained males (19 percent) and females (21 percent) scored above 185 on the Perceived Innovation Questionnaire. Likewise, an almost equal percentage of right-brained females (18 percent) and males (17 percent) scored 155 or below on the PIQ. In the medium range (155 to 184), however, females exceeded males in right-brained dominance (males 13 percent; females 39 percent). A far higher percentage of left-brained males (20 percent) scored in the low level of the PIQ in contrast to 9 percent females. These data show a trend for right-brained females to score higher on this particular measurement of innovation (PIQ) than do right-brained males.

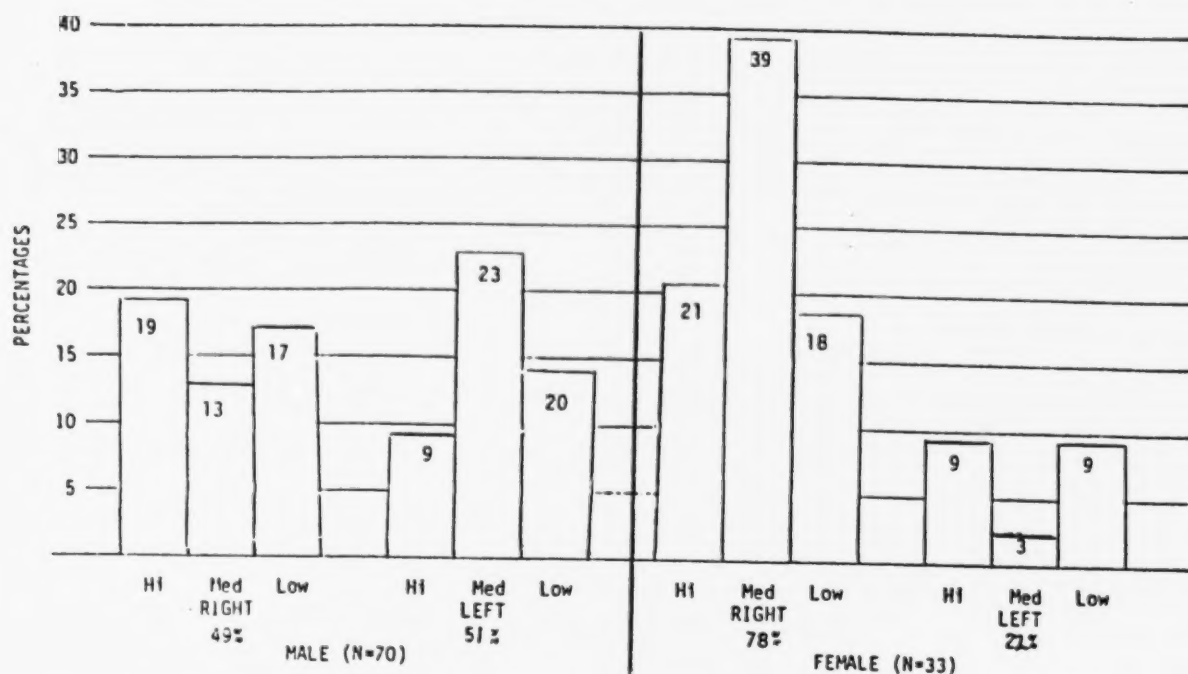


Figure 4: Frequency Distribution and Percentages of Male and Female Groups on Innovative Management Questionnaire by Brain Dominance.

III. Discussion of Findings

Nomination Rankings

An analysis of the dominance patterns of educational administrators in relation to their nominated strengths substantiates the validity of the rankings assigned. As demonstrated, those most likely to receive a high ranking in conceptual skill were right-brained; those most likely to receive a high ranking in technical skill were predominantly left-brained.

Katz' (1974) research indicates that conceptual skill should be the most pronounced leadership quality at the highest administrative level; technical skill should be of least importance. In contrast to Katz findings, the superintendents in this study ranked lowest in conceptual skill and highest in technical ability. Their predominate left-brained styles substantiate this finding. Principals, in contrast, were more characteristically whole brained and ranked highest in conceptual skill.

Superintendents

Superintendents in this study, as reflected by both their brain dominance patterns and rankings on the Katz management skills, appear to have a cognitive

style that is ineffective for conceptualizing visions of the future. These findings reflect results of previous studies by Ziegler (Schneider: 1973:4) who classified superintendents as "status-quo" thinkers and Coulson (1984) who found superintendents much less adept in conceptualizing than in analyzing and more "safe keeping" in problem solving strategies than were high ranking industrial leaders.

Such findings reaffirm Dyer and Dyer's (1965) suggestion that the status quo, maintenance leader is threatened by attempts to bring about change. All administrative efforts appear to be, as these authors suggest, concerned with the prediction or achievement of known, predictable, measureable items or goals in accordance with familiar unchanging doctrines, procedures and methods" (p. 33). What implications do these tendencies have for the crucial nature of today's educational problems? The characteristic of superintendents to think in a status quo vein could further compound education's need for change, for as Ohmae (1982) suggests, fear causes one to hold even tighter to the tried and true. When pressures increase, leaders often react with a "limited scope of vision that entraps deer on the highway" (p.10). As public education is threatened and pressures increase, will superintendents lean even more heavily upon their dominant left-brained nature? Will progress be blocked in blind attempts to "safeguard" the educational system?

And what of the other administrative positions? Will principals and supervisors react differently from superintendents? How will superintendents, in turn, relate to their (principals' and supervisors') styles?

Principals

Findings from this current study of Tennessee administrators suggest that superintendents may be unprepared for the "boat rocking" principals which Manasse (1984:43) indicates they may encounter. "Principals of successful schools," she suggests, "have a vision of what their schools should be and of their role in achieving it" (p. 43). This belief is confirmed by recent effective school's research suggesting that the principal's role is highly significant.

Results of the present study demonstrate that principals do, in fact, have a better balance of analytical and conceptual thought patterns than do superintendents. Not only is this reflected in their brain dominance patterns, but it is supported by the high rankings they received in conceptual ability as well as by their high scores on the Perceived Innovation Questionnaire.

Supervisors

Of all administrative groups, supervisors appear to be strongest in their capacity for conceptualization as manifested by their right-brained scores. In addition, 30% of this group received a ranking of "1" in conceptual skill which is comparable to the 36% of principals so ranked. Since this study has demonstrated a significant relationship between conceptualization and right-brained style, it would seem that the conceptualization skills of supervisors should be more visible. As Levitt suggested "Just getting ideas is not enough - one must implement them" (p. 10).

Supervisory PIQ scores ranked lowest of all administrative groups on Total Score mean when quantity of implementation was considered. However, when only Subtotal Score (which did not include a quantifiable measurement of innovation) was used, their scores were significant ($p < .03$) when compared with right brain dominance. These results suggest, that at least in the thinking mode, they are the most innovative. Such conclusions pose the following questions:

1. Are supervisors hampered by their staff positions in their ability to implement change?
2. Do they hesitate to suggest ideas for change because of the uncertainty of their position rank?
3. Are supervisors too far removed from the real world of education by the safety and isolation of their central office positions?
4. Are supervisors (particularly the high percentage of women in this position) less willing to risk their first inroads into administration by suggesting innovations which might threaten the status quo?

Men vs. Women

Not only do there appear to be differences among administrative groups in this study but there are likewise differences related to male and female leaders. Women were found to surpass men in the holistic approach which they bring to educational leadership. This is supported by their brain dominance patterns and suggested by the high Subtotal Scores which they received on the PIQ (women represent 79% of the subjects in the supervisors group whose PIQ Subtotal Scores were found to relate significantly to right-brain dominance ($p < .03$)).

In this new age of maximizing human potential, the time has come to allow women the increased opportunity to fill positions with line authority. It is the time, certainly, to take a renewed look at the wisdom of a traditional career

path leading from building-level principal to superintendent. Such a line of succession causes education to lose much of the potential for holistic leadership which this study has shown to be present among women. Can education afford to ignore such potential?

Concluding Remarks

In summation, a review of the literature which formed the framework for this study, as well as study results, have implications for today's leader. Such information suggests that if effective changes are to occur within the public schools there must be educational leaders of vision who can creatively conceptualize future educational directions. This requires an ability to "see the forest instead of merely the trees" or a cognitive style that is global and holistic. Such is the cognitive style of the right hemisphere.

Not only is it imperative that education have visionary leadership but that leadership must be courageous in its efforts to move in new directions. The status-quo nature, so indicative of left-brained thinking, must be balanced by an open, receptive mode which is again characteristic of an intuitive right-brained nature.

Finally, if educational leaders are to move the educational system forward effectively, they must be adept at working with and through others to accomplish needed change. A humanistic, empathic feeling for others must exist as well as an intuitive sense of the appropriate. Refinement of these qualities is highly dependent upon a leader exercising his/her right-brained nature or developing the full power of a whole-brained style. If, instead, educational leadership comes predominantly from the technical, conservative managerial style of the left hemisphere, there is little likelihood that education will move creatively toward new horizons.

BIBLIOGRAPHY

Bibliography

- Coulson, Louis T. and Alison G. Strickland. "A Comparison of the Thinking Style Preferences of Superintendents of Schools and Chief Executive Officers," International Brain Dominance Review. Brain Dominance Institute, Lake Lure, N.C., Winter 1984, 1 (1).
- Dyer, Frederick and John M. Dyer. Bureaucracy vs. Creativity. Coral Gables: University of Miami Press, 1965.
- Herrmann, Ned. "The Creative Brain Part II." Training and Development Journal, December 1982, 36 (12), 75-88.
- Katz, Robert L. "Skills of an Effective Administrator." Harvard Business Review, September-October 1974, 52 (5), 90-102.
- Levitt, Theodore. "Creativity Is Not Enough." Harvard Business Review, May-June 1963.
- Manasse, A. Lorri. "Principals as Leaders of High-Performing Systems." Educational Leadership, February 1984, 41 (5), 42-46.
- Ohmae, Kenichi. "The Secret of Strategic Vision." Management Review, April 1982, 71 (4), 9-13.
- Pascale, Richard Tanner and Anthony G. Athos. The Art of Japanese Management. New York: Simon and Schuster, 1981.
- Schneider, Joseph E. "Roadblocks to Reform." D/R Report by Council for Educational Development and Research, April 1973, 2 (3), 3-5.

APPENDIX

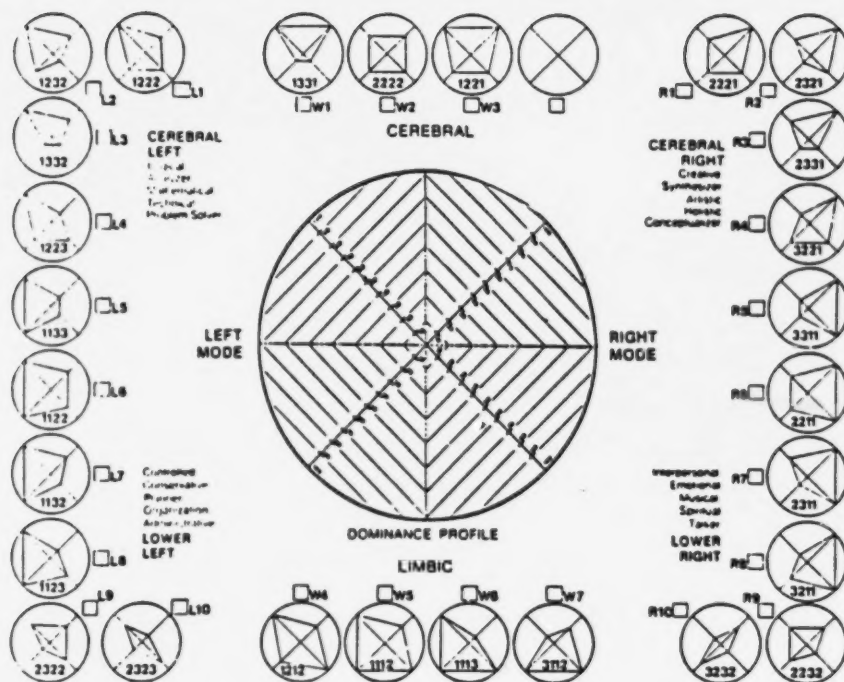


Figure 25. Most Common Brain Dominance Profiles.

Source: Ned Herrmann. Materials presented at Application Workshop, Herrmann Brain Dominance Instrument, Lake Lure, North Carolina, February 1983.

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Group I:

Right/Whole Brain

Codes: 1111; 1211; 1121; 1221; 2111;
2211; 1131; 1112; 2121 .

Group II:

Left/Limbic

Codes: 1122, 1123; 1132; 2122; 2112

Figure 26. Dominance Profile Grouping. ----

Source: Classification of Codes into larger clusters was done by researcher after confering by phone with Ned Herrmann on November 26, 1983.

<u>Profile</u>	<u>Classification</u>
1111	Whole Brained
1121, 1211, 1131	Whole Brained Cerebral
1221	Double Dominant Cerebral
1112, 2111	Whole Brained Limbic
2211	Right Brained
2121	Double Dominant Left Limbic/ Right Cerebral
2122	Left Limbic
1122, 1123, 1132	Left Brained
2112	Double Dominant Limbic

Figure 27. Profile Clusters* of Administrative Groups.

*As identified and classified by Ned Herrmann in phone conversation on November 26, 1983.

RATING DEFINITIONS

SKILLS OF AN EFFECTIVE ADMINISTRATOR

Adapted From:

Katz, Robert L. "Skills of an Effective Administrator,"
Harvard Business Review, Sept-Oct., 1974, Vol. 52, No. 5, 90-102.

Technical Skill: Having analytical skill and knowledge within a specialized field, and being able to incorporate the tools and techniques representative of that field.

Human Skill: Being able to work with people in a perceptive, empathetic manner. Having sensitivity to the needs of others within the organization and taking action in consideration of those needs.

Conceptual Skill: Having the ability to sense the organization as a whole and to perceive the total situation relative to it. The ability to visualize and to creatively move the organization forward.